Decadal Climate Variation Demonstration

- Predictability of the Atlantic Meridional Overturning Circulation (AMOC) is presented as a candidate of the Decadal Climate Variation Demonstration

- AMOC has been postulated as a driver for abrupt climate changes in the past, but the relationship to modern climate is unclear

- Modeling studies demonstrate a link between AMOC variability and subpolar SST

AMOC Demonstration

- AMOC represents an opportunity and a challenge
  - By 2014, a 10 year time series of the AMOC will exist. Rare to have a detailed complete observation of a potential climate driver
  - Heavy investment by US Global Climate Change Research Program in AMOC
    - 41 funded investigation
    - IPCC AR5 AMOC comparisons

AMOC Demonstration

- AMOC represents an opportunity and a challenge
  - AMOC as calculated by modelers not exactly what is observed by RAPID
  - AMOC has components which vary on short time scales which may not be predictable
  - Direct link between climate and AMOC not clear
    - Subpolar SST variability is observed to be correlated

AMOC Demonstration

- Initial activities for Science Team
  - Identify potential players from the existing modeling groups
    - Climate Forecast System NOAA –Dave Behringer
    - Community Earth System Model NCAR/DOE/University/NOAA—Danabasoglu, Maltrud, McClean, Bleck
    - MITgcm—Marshall
    - GFDL CM2—Delworth
    - NASA GMAO
    - CMIP others

AMOC Demonstration

- Initial activities for Science Team
  - Identify potential players from the existing USGCRP AMOC Science Team
    - Observation Task Team—Lozier, M. Behringer
    - Mechanisms and Predictability Task Team--Danabasoglu
    - Climate Sensitivity Task Team—Chang

  Participation by UK RAPID team members?

AMOC Demonstration

- Baseline Assessment

  – What is the strength and depth of the AMOC in current generation of coupled and uncoupled models?

  – For the models with long runs, what is the variability and trend of the AMOC

  – Results from CMIP AMOC comparisons and sensitivity

AMOC Demonstration

- Build strong links to USGCRP AMOC Science Team
  - Science Team meeting in Boulder 15-17 Aug, 2012
- Develop Science Goals for Demo
  - Decadal prediction of AMOC 2004-14 RAPID obs
  - Determine what is predictable on 10 year time
    - Mean value
    - Variance
    - Seasonal cycle

AMOC Demonstration

- Timeline
  - FY13 Establish Science Team, Baseline Assessment, Goals for demo
  - FY14 Continue Baseline Assessment
    - Establish ground work for Shoot Out
  - FY15 CMIP like effort to predict 10 yr RAPID obs
  - FY16 Evaluate Shoot Out/Look at AMOC climate sensivity
  - FY17 Identify critical path, resource and technology issues for transition into operations
    - Who is the target for this operation?

AMOC Demonstration

- Caveats
  - Is the RAPID 2004-14 timeseries a reasonable dataset for a shoot out?
  - Assumes access to complete US/UK dataset and active participation by observationalists
  - Is this activity better performed by USGCRP?